--------------------------- CEN 4072/6070 Software Testing & Verification -------------------------

Quiz 5 – Spring 2017 – Solution Notes

1.

	P
f_1	N
f_2	S
f_3	C

[*P*] = (x≥y -> x,y := y,x | true -> I) = (x>y -> x,y := y,x | true -> I)

2. d. (xy>0 -> x,y := x+xy,3 | xy<0 -> x,y := x-xy,3 | true -> x,y := x,3)

[P] = [S3] o [S2] o [S1] where
[S1] = (x,y := x,xy)
[S2] = (y>0 -> x,y := x+y,y | y≤0 -> x,y := x-y,y)
[S3] = (x,y := x,3)

= (x,y := x,3) o (y>0 -> x,y := x+y,y | y≤0 -> x,y := x-y,y) o (x,y := x,xy)
= (x,y := x,3) o (xy>0 -> x,y := x+xy,xy | xy≤0 -> x,y := x-xy,xy)
= (xy>0 -> x,y := x+xy,3 | xy≤0 -> x,y := x-xy,3)

3. a. *g*=(x,y := x+1,y-1)
b. *p*: y≠0 ¬*p:* y=0
c. i. measure: y
ii. All values of y in the domain of *f*, i.e., for y≥0.
iii. 0
d. Proof that *p* ⇒ (*f*=*f*o*g*): As *p* is y≠0, there are 2 cases to consider: y<0 and y>0.

case a: y<0

(y<0) ⇒ (*f* = ***undefined*** **)**

(y<0) ⇒ (*f* o *g* = *undefined* o (x,y := x+1,y-1)

since (y<0) o *g*(y<0)) = true

= **undefined**)

Therefore, (y<0) ⇒ (*f* = *f* o *g*)

case b: y>0

(y>0) ⇒ (*f* = **(x,y := x+y,0)**)

(y>0) ⇒ (*f* o *g* = (x,y := x+y,0) o (x,y := x+1,y-1)

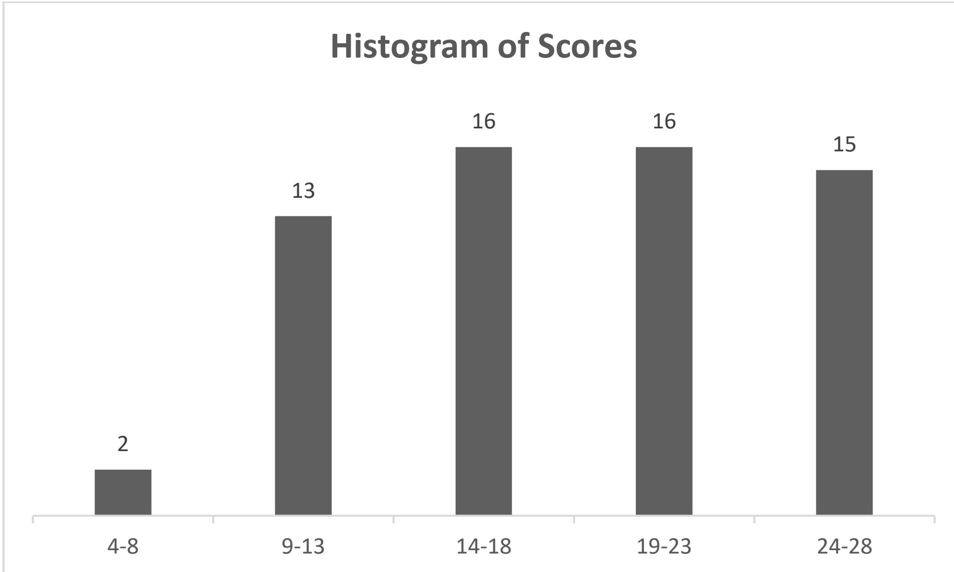
since ((y≥0) o *g*(y>0)) = true

= (x,y := (x+1)+(y-1),0)

= **(x,y := x+y,0)**)

Therefore, (y>0) ⇒ (*f* = *f* o *g*)

Therefore, *p* ⇒ (*f* = *f* o *g*)


Histogram of Scores
2
13
16
16
15
4-8
9-13
14-18
19-23
24-28